SECTION 07 27 13

SELF-ADHERED SHEET MEMBRANE AIR / WATER BARRIER

PART 1 GENERAL

1.1 DESCRIPTION:

A. The work of this section includes, but is not limited to, the following:
B. Materials and installation methods for sheet membrane applied air and vapor barrier membrane system.
C. Materials and installation methods to bridge and seal air leakage pathways in roof and foundation junctions, window and door openings, control and expansion joints, masonry ties, piping and other penetrations through the wall assembly.
D. Thru-wall flashing for masonry veneer specified in Section 04 20 00 - Masonry.

1.2 RELATED WORK:

All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Manufacturer's Literature and Data:
Self-Adhered Sheet Membrane Air / Water Barrier
Wall Flashing, Transition Membrane and Accessories
Submit manufacturer's product data, installation instructions, use limitations and substrate preparation recommendations. Written documentation demonstrating installers qualifications under the "Quality Assurance" article including reference projects of a similar scope.
C. Samples:
Submit representative samples of the following for approval:
Self-Adhered Air Barrier Membrane
Self-Adhered Transition Membrane
Self-Adhered Wall Flashing
D. Manufacturer's Certificates:
Warranty
Submit a sample warranty identifying the terms and conditions stated in Section 1.9.

1.4 QUALITY ASSURANCE

A. Manufacturer
Air and vapor barrier systems shall be manufactured and marketed by a firm with a minimum of 10 years experience in the production and sales of waterproofing and air barrier products.
Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified.
B: Installer

1. List of at least three (3) projects contracted within the past five (5) years of similar scope and complexity to this project carried out by the firm and site supervisor.
2. Installer must show evidence of adequate equipment and trained field personnel to successfully complete the project in a timely manner.

C. Pre-Installation Conference

A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include but not be limited to the following:

1. Review of submittals.
2. Review of surface preparation, minimum curing period and installation procedures.
3. Review of special details and flashings.
4. Sequence of construction, responsibilities and schedule for subsequent operations.
5. Review of mock-up requirements.
6. Review of inspection, testing, protection and repair procedures.

D. Mock-up

Prior to installation of the air and vapor barrier system a field constructed mock-up shall be provided to verify details and tie-ins and to demonstrate the required quality of materials and installation. Construct a typical exterior wall section, 8 feet long and 8 feet wide, incorporating back-up wall, cladding, window and doorframe and sill, insulation, flashing and any other critical junction (roof, foundation, etc). Allow 24 hours for inspection of mock-up before proceeding with air and vapor barrier work. Mock-up may remain as part of the work.

E. Inspection

Cooperate and coordinate with the Government's inspection. Do not cover any installed air and vapor barrier membrane until it has been inspected, and approved.

1.5 .5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets.

B. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.

C. Do not double-stack pallets of fluid applied membrane components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.

D. Protect fluid-applied membrane components from freezing and extreme heat. Sequence deliveries to avoid delays, but minimize on-site storage.

1.6 APPLICABLE PUBLICATIIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM):
ASTM INTERNATIONAL (ASTM)

ASTM B 117 (2009) Standing Practice for Operating Salt Spray (Fog) Apparatus

ASTM INTERNATIONAL (ASTM)

ASTM C 1177/C 1177M (2008) Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing

ASTM INTERNATIONAL (ASTM)

ASTM C 1186 (2008) Standard Specification for Flat Non-Asbestos Fiber Cement Sheets

ASTM INTERNATIONAL (ASTM)

ASTM C 1278/C 1278M (2007) Standard Specification for Fiber-Reinforced Gypsum Panel

ASTM INTERNATIONAL (ASTM)

ASTM C 1325 (2008b) Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Substrate Sheets

ASTM INTERNATIONAL (ASTM)

ASTM C 150/C 150M (2009) Standard Specification for Portland Cement

ASTM INTERNATIONAL (ASTM)

ASTM C 473 (2009) Physical Testing of Gypsum Panel Products

ASTM INTERNATIONAL (ASTM)

ASTM C 578 (2009el) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

ASTM INTERNATIONAL (ASTM)

ASTM C 67 (2009) Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile

ASTM INTERNATIONAL (ASTM)

ASTM C 847 (2009) Standard Specification for Metal Lath

ASTM INTERNATIONAL (ASTM)

ASTM C 920 (2008) Standard Specification for Elastomeric Joint Sealants

ASTM INTERNATIONAL (ASTM)

ASTM D 2247 (2009) Testing Water Resistance of Coatings in 100% Relative Humidity

ASTM INTERNATIONAL (ASTM)

ASTM D 3273	(2000; R 2005) Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

ASTM INTERNATIONAL (ASTM)

ASTM D 968	(2005e1) Abrasion Resistance of Organic Coatings by Falling Abrasive

ASTM INTERNATIONAL (ASTM)

ASTM E 136	(2009a) Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C

ASTM INTERNATIONAL (ASTM)

ASTM E 2098	(2000; R 2006) Determining Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for Use in Class PB Exterior Insulation and Finish Systems (EIFS) after Exposure to a Sodium Hydroxide Solution

ASTM INTERNATIONAL (ASTM)

ASTM E 330	(2002) Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

ASTM INTERNATIONAL (ASTM)

ASTM E 331	(2000; R 2009) Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

ASTM INTERNATIONAL (ASTM)

ASTM E 695	(2003; R 2009) Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading

ASTM INTERNATIONAL (ASTM)

ASTM E 84	(2009c) Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM INTERNATIONAL (ASTM)

ASTM E 96/E 96M	(2005) Standard Test Methods for Water Vapor Transmission of Materials

1.7 PROJECT CONDITIONS:

Perform work only when existing and forecasted weather conditions are

within the limits established by the manufacturer of the materials used. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive the air and vapor barrier membrane.

1.8 WARRANTY

Submit manufacturer's 5 year warranty that air and vapor barrier and accessories are free of defects at time of delivery and are manufactured to meet manufacturer's published physical properties and material specifications.

1.9 PERFORMANCE REQUIREMENTS

Provide an air and vapor barrier system to perform as a continuous barrier to air infiltration/exfiltration and water vapor transmission and to act as a liquid water drainage plane flashed to discharge any incidental condensation or water penetration. It must be continuous, with all joints made airtight.

1. It shall have an air permeability not to exceed 0.004 cfm/ft2 under a pressure differential of 0.3 in. water. (1.57 psf.) (equal to 0.02L/s/m2 @ 75 Pa.).
2. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
3. It shall be durable or maintainable.
4. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
    a. Foundation and walls.
    b. Walls and windows or doors.
    c. Different wall systems.
    d. Wall and roof.
    e. Wall and roof over unconditioned space.
    f. Walls, floor and roof across construction, control and expansion joints.
    g. Walls, floors and roof to utility, pipe and duct penetrations.
5. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

PART 2 PRODUCTS

2.1 GENERAL

For each type of material required for the work of this section, provide primary materials that are the products of one manufacturer.

2.2 SELF-ADHERED AIR/MOISTURE BARRIER MEMBRANE

A. Description: Min. 1 mm (.040 in) thick membrane comprised of 0.9 mm (0.036 in) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (.004 in) of cross-laminated, high-density polyethylene film. Membrane shall be interleaved with disposable silicone-coated release paper until installed.

B. Performance Requirements

Property	Test Method	Typical Value
Thickness	ASTM D 3767	1.0 mm (0.040 in.) nominal

Method A Air Permeance at 75Pa (0.3 in. water)	ASTM E 2178	<0.001 L/(s.m2) <0.0002 cfm/ft2)
Differential Pressure Assembly Air Permeance at 75Pa (0.3 in. water)	ASTM E 2357	<0.004 L/s*m2 (<0.0008 cfm/ft2)
Differential Pressure Water Vapor Permeance (0.05 Perms) Method B	ASTM E 96/E 96M,	Less than 2.9 ng/Pa.s.m2
Water Absorption:	ASTM D 570	Max. 0.1% by weight
Puncture Resistance	ASTM E 154	178 N (40 lbs.)
Tear Resistance ASTM D 1004	Initiation:	Min. 58 N (7.0 lbs.) M.D.
ASTM D 1938	Propagation:	Min. 40 N (4.0 lbs.) M.D.
Lap Adhesion at -4°C (25°F)	ASTM D 1876	880 N/m (5.0 lbs./in.) of width
Low Temperature Flexibility	ASTM D 1970	Unaffected to -43°C (-45°F)
Tensile Strength	ASTM D 412, Die C Modified	Min. 2.7 MPa (400 psi)
Elongation, Ultimate Failure of Rubberized Asphalt	ASTM D 412	Min. 200% - Die C

C. Materials: Basis of Design: Perm-A-Barrier® Wall Membrane from Grace Construction Products, 62 Whittemore Avenue, Cambridge, MA.

2.3 TRANSITION MEMBRANE

A. Description: Min. 1 mm (.040 in) thick membrane comprised of 0.9 mm (0.036 in) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (.004 in) of cross-laminated, high-density polyethylene film. Membrane shall be interleaved with disposable silicone-coated release paper until installed.

B. Performance Requirements:

1. Water Vapor Transmission: ASTM E 96, Method B: 2.9 ng/m2sPa (0.05 perms) max.
2. Air Permeance at 75Pa (0.3 in. water) pressure difference: 0.0006 L/(s.m2) (0.00012 cfm/ft2) max.
3. Puncture Resistance: ASTM E 154: 178 N (40 lbs.) min.
4. Lap Adhesion at -4°C (25°F), ASTM D 1876: 880 N/m (5.0 lbs./in.) of width min.
5. Low Temperature Flexibility, ASTM D 1970: Unaffected to -43°C (-45°F).
6. Tensile Strength, ASTM D 412, Die C Modified: min. 2.7 MPa (400 psi)
7. Elongation, Ultimate Failure of Rubberized Asphalt, ASTM D 412 Die C: min. 200%

C. Materials: Basis of Design: Perm-A-Barrier Detail Membrane manufactured by Grace Construction Products.

2.4 FLEXIBLE MEMBRANE WALL FLASHING

A. Description: Min. 1 mm (.040 in) thick membrane comprised of 0.8 mm (0.032 in) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (.008 in) of cross-laminated, high-density polyethylene film. Membrane shall be interleaved with disposable silicone-coated release

paper until installed. Thru-wall flashing for masonry veneer specified in Section 04 20 00 - Masonry

B. Performance Requirements:

1. Water Vapor Transmission, ASTM E 96, Method B: 2.9 ng/m2sPa (0.05 perms) max.
2. Water Absorption, ASTM D 570: max. 0.1% by weight
3. Puncture Resistance, ASTM E 154: 356 N (80 lbs.) min.
4. Tear Resistance
   a. Initiation ASTM D 1004: min. 58 N (13.0 lbs.) M.D.
   b. Propagation ASTM D 1938: min. 40 N (9.0 lbs.) M.D.
5. Lap Adhesion at -4°C (25°F), ASTM D 1876: 880 N/m (5.0 lbs./in.) of width
6. Low Temperature Flexibility, ASTM D 1970: Unaffected to -43°C (-45°F)
7. Tensile Strength, ASTM D 412, Die C Modified: min. 5.5 MPa (800 psi)
8. Elongation, Ultimate Failure of Rubberized Asphalt, ASTM D 412, Die C: min. 200%

C. Materials: Basis of Design: Perm-A-Barrier Wall Flashing manufactured by Grace Construction Products.

2.5 AIR & VAPOR BARRIER ACCESSORIES

A. Primer: Water-based primer which imparts an aggressive, high tack finish on the treated substrate

1. Flash Point: No flash to boiling point
2. Solvent Type: Water
3. VOC Content: Not to exceed 10 g/l
4. Application Temperature: -4°C (25°F) and above
5. Freezing point (as packaged): -7°C (21°F)

B. Primer Basis of Design: Perm-A-Barrier WB Primer manufactured by Grace Construction Products.

C. Sealant: Two-part, elastomeric, trowel grade material designed for use with self-adhered membranes and tapes. 10 g/l max. VOC Content.

D. Sealant Basis of Design: Bituthene® Liquid Membrane manufactured by Grace Construction Products.

2.6 OPTIONAL PRIMERS

A. Description: High tack water based primer. 10 g/l max. VOC content.
Product: Basis of Design: Perm-A-Barrier Liquid Part B manufactured by Grace Construction Products.

B. Description: High tack low VOC solvent based primer. <200 g/l max. VOC content.
Product: Basis of Design: Bituthene Primer B2 LVC manufactured by Grace Construction Products.

C. Description: High tack solvent based primer. 440 g/l max. VOC content.
Product: Basis of Design: Bituthene Primer B2 manufactured by Grace Construction Products.

PART 3 EXECUTION

3.1 EXAMINATION

The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the

work. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer.
B. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws in accordance with exterior sheathing manufactures written instructions.
C. Masonry Substrates: Apply air and vapor barrier over concrete block and brick with smooth and flush mortar joints. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
D. Related Materials: Treat construction joints and install flashing as recommended by air barrier manufacturer.

3.3 INSTALLATION

A. Refer to manufacturer's literature for recommendations on installation. Apply air/moisture barrier membrane to achieve a continuous air/moisture barrier according to air/moisture barrier manufacturer's written instructions.
B. Application of Self-Adhered Air/Moisture Barrier Membrane: Install air & vapor barrier to dry surfaces at air and surface temperatures of -4°C (25°F) and above in accordance with manufacturer's recommendations, at locations indicated on Construction Documents. Prime substrate to receive air barrier membrane as required per manufacturers written instructions. Precut pieces of air & vapor barrier into easily handled lengths. Remove silicone-coated release paper and position membrane carefully before placing length horizontally against the surface.
C. Begin installation at the base of the wall placing top edge of membrane immediately below any masonry reinforcement or ties protruding from substrate. Install membrane horizontally. When properly positioned, place against surface by pressing firmly into place. Roll membrane with extension-handled countertop roller immediately after placement. Overlap horizontally adjacent pieces 50 mm (2 in.) and roll seams. Subsequent sheets of membrane applied above shall be positioned immediately below masonry reinforcement or ties. Bottom edge shall be slit to fit around reinforcing wires or ties, and membrane shall overlap the membrane sheet below by 50 mm (2 in.). Roll firmly into place. Seal around masonry reinforcing or ties and all penetrations with termination mastic. Continue the membrane into all openings in the wall, such as doors, windows, etc., and terminate at points that will prevent visibility from interior. Coordinate the installation of air & vapor barrier with roof installer to ensure continuity of membrane with rooftop air & vapor membrane. At end of each working day seal top edge of air & vapor barrier to substrate with termination mastic. Do not allow the rubberized asphalt surface of the air & vapor barrier membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.
D. Do not expose air & vapor barrier membrane to sunlight for more than thirty days prior to enclosure. Inspect installation prior to enclosing and repair punctures, damaged areas and inadequately lapped

seams with a patch of the membrane sized to extend 150 mm (6 in.) in all directions from the perimeter of the affected area.

E. Application of Transition Membrane: Prime substrate to receive transition membrane as required per manufacturer's written instructions. Apply transition membrane with a minimum overlap of 75mm (3 in.) onto each surface at all beams, columns and joints as indicated in detail drawings. Tie in to window and door frames, spandrel panels, roof and floor intersections and changes in substrate.

F. Use pre-cut, easily handled lengths for each location. Remove silicone-coated release paper and position membrane flashing carefully before placing it against the surface. When properly positioned, place against surface by pressing firmly into place by hand roller. Overlap adjacent pieces 50 mm (2 in.) and roll all seams with a hand roller. Seal top edge of flashing with termination mastic. When transition flashing is pre-installed prior to application of Fluid Applied Membrane, apply transition flashing as above. Spray or trowel a continuous uniform film of Fluid Membrane at min. 60 mils (1.5 mm or .060 in.) dry film thickness using multiple, overlapping passes, with a minimum overlap of 75 mm (3 in.) onto transition flashing. For sill condition, spray or trowel Fluid Membrane onto pre-installed sill flashing and onto horizontal section of sill.

G. Application of Flexible Membrane Wall Flashing: Prime substrate to receive wall flashing as required per manufacturers written instructions. Precut pieces of flashing to easily handled lengths for each location. Remove silicone-coated release paper and position flashing carefully before placing it against the surface. When properly positioned, place against surface by pressing firmly into place by hand roller. Fully adhere flashing to substrate to prevent water from migrating under flashing. Overlap adjacent pieces 50 mm (2 in.) and roll all seams with a hand roller. Trim bottom edge 13 mm (1/2 in.) back from exposed face of the wall. Flashing shall not be permanently exposed to sunlight.

H. At heads, sills and all flashing terminations, turn up ends a minimum of 50 mm (2 in.) and make careful folds to form an end dam, with the seams sealed. Seal top edge of flashing with termination mastic. Do not allow the rubberized asphalt surface of the flashing membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.

3.4 PROTECTION AND CLEANING

Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed work using procedures as recommended by manufacturer. Wall membrane is not suitable for permanent exposure and should be protected from the effects of sunlight. Schedule work to ensure that the wall membrane system is covered as soon as possible after installation. Protect wall membrane system from damage during subsequent operations. If the wall membrane system cannot be covered within 30 days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

-- End of Section --